A SPECIAL REPORT:

AFFORDABILITY OF MAJOR WASTEWATER SYSTEMS IMPROVEMENTS FOR SMALL MONTANA COMMUNITIES

October, 1990

MONTANA DEPARTMENT OF COMMERCE
Local Government Assistance Division
Community Technical Assistance Program

AFFORDABILITY OF MAJOR WASTEWATER SYSTEMS IMPROVEMENTS FOR SMALL MONTANA COMMUNITIES

Prepared by:

Jim E. Richard, Consultant

Published by:

MONTANA DEPARTMENT OF COMMERCE

Local Government Assistance Division

Community Technical Assistance Program

Funded by:

Montana Community Technical Assistance Program

Montana Department of Health and Environmental Sciences

U.S. Environmental Protection Agency

Office of Municipal Pollution Control, SCORE Grant #T-901808-01-0

Helena, Montana

October 1990

PREFACE

This publication is a report of findings and recommendations regarding the difficulty small Montana communities have in financing needed sewer facilities. Jim E. Richard was retained as a financial consultant by the Department of Commerce to produce the report under the asuspices of a U.S. Environmental Protection Agency grant. This report was made possible by the cooperation of various state and private funding and technical assistance agencies.

Project Participants

Consultant: **Jim E. Richard**
Box 508
White Sulphur Springs, Montana 59645
(406) 547-2289

For the Montana Department of Commerce:

Newell Anderson, Administrator, Local Government Assistance Division
Dave Cole, Chief, Community Development Bureau
Robb McCracken, Program Manager, Community Technical Assistance Program
Ann Desch, Planner IV, Community Technical Assistance Program
Don Dooley, Chief, Local Government Services Division
Jim Courtney, Supervisor, Accounting and Management Systems

For the Montana Department of Health and Environmental Sciences:

Scott Anderson, Supervisor, Construction Grants Section, Water Quality Bureau
Dick Pedersen, Environmental Specialist, Water Quality Bureau
Paul Montgomery, Environmental Engineer, Water Quality Bureau
Karen Bucklin Sanchez, Environmental Engineer, Water Quality Bureau

For the Montana Department of Natural Resources and Conservation:

Greg Wermers, Civil Engineer, Conservation and Resource Development Division
Bob Morgan, Financial Advisor, Conservation and Resource Development Division

Advising Organizations:

Bill Leonard, Midwest Assistance Program
Ray Wadsworth, Montana Rural Water Systems, Inc.

Further Information

For further information on this topic or publication contact:

Robb McCracken, Project Coordinator
Community Technical Assistance Program
Montana Department of Commerce
Cogswell Building, Room C-211
Helena, Montana 59620
(406) 444-3757

TABLE OF CONTENTS

LIST OF FIGURES

Page

EXECUTIVE SUMMARY

AN EXAMPLE OF THE PROBLEM

In St. Regis, a small unincorporated community in western Montana, one of the main restaurants will not be expanding this year because septic systems are failing. Land is not available for replacement drainfields, and there is no community sewer system. In addition to the loss of potential economic and employment growth, sewage from failing septic systems likely is contaminating wells in the community and is percolating into the Clark Fork River. St. Regis is representative of the current situation in many small Montana communities.

PURPOSE

The purpose of this study, contracted by the Montana Department of Commerce, was to review available statewide data and study four small Montana communities with existing sewer system deficiencies to determine the financial feasibility of installing new systems -- given the existing financing mechanisms currently available.

QUESTION POSED

Can small Montana communities reasonably afford to construct new sewer facilities that meet the existing and future public health and environmental regulations? Statewide data was reviewed for communities under 4,000 in population, particularly those with populations under 2,500.

CURRENT SITUATION

The Small Community

- In Montana, one-third of the state's population lives in communities of less than 2,500. These are the people that bear the heaviest financial burden per household in constructing adequate sewage systems.

- Small Montana communities have lower household incomes than larger communities.

- Small communities cannot take advantage of economies of scale; they have fewer people to help pay for new construction or repair.

- A typical $1 million sewage collection and treatment system in a community with 500 residents (approximately 200 households) would cost each household $44 per month just to pay the debt service on a conventional 20-year revenue bond. With $10 per month for operation and maintenance costs, each household would pay a total of $54 per month.

- Because a sewer system is not visible to the public, communities often experience the "out of sight, out of mind" syndrome. Deterioration of the physical plant goes unnoticed, and maintenance is deferred to reduce operating costs and keep user charges low. Consequently, small towns get further behind in keeping up with needed maintenance and repairs.

- At the same time that small communities with limited resources are facing costly sanitation improvements, existing state and federal financial programs are falling far short of bridging the affordability gap.

Decrease in Funding

- Over the last 10 years, the federal and state funding sources for Montana all have had their funding reduced.

  – Community Development Block Grant (CDBG) -- reduced 18%
  – U.S. Farmers Home Administration (FmHA) --reduced 50%
  – Montana Department of Natural Resources (DNRC) water development program -- received only 13% of the grant funding level authorized by statute
  – The EPA construction grant program was discontinued. The new State Revolving Fund (SRF) loan program has replaced it.

  Because of intensive competition for the limited level of funding, CDBG and the FmHA each have funded an average of only two sewer projects per year. The DNRC has funded an average of only 2-4 sewer projects each biennium since the program began in 1983.

- The SRF, with 20-year bonds at a proposed 3 or 4 percent interest, will help many larger communities that can afford a bond at 3 or 4 percent interest, but even the low-interest financing will not be affordable for small communities.

- Even when combining the SRF with other grant/loan programs, the cost is still very high and often unaffordable for small communities.

  For example, in Arlee, Montana, a proposed new $1 million sewer system, even with all maximum grants and loan subsidies reasonably available from CDBG, DNRC and the SRF, would still cost each household $51 per month. This simply is not affordable for Arlee.

Statewide Perspective

- Montana residents simply are not willing, or able, to pay sewer rates as high as those in the above examples.

- Thirty-two small Montana communities are currently listed on the DHES SRF priority list as having deficient systems or identified needs by state or federal standards. For these communities it will cost an estimated $24 million for new construction or an upgrade of the existing systems.

- Statewide needs are even greater. The Montana Department of Commerce estimates that the state's financial need for wastewater improvements is approximately $350 million.

- Improperly treated sewage creates the following problems:

  – presence of public health hazards
  – degradation of water quality -- ground water, streams, and lakes
  – oxygen depletion that can kill fish and other animals and plants
  – reduction in quality of life -- negative impact on the natural beauty of the environment, and negative impact on recreation
  – loss of opportunities for business growth

CAUSES

- The principal causes of these deficient systems are:

  - aging facilities
  - deferred maintenance
  - overloaded systems that lack sufficient capacity
  - increased federal and state standards for clean water
  - cumulative impacts of proliferating use of individual septic systems in once sparsely populated rural areas.

The principal cause of a continued deficient system is that most solutions are not affordable to the community or users.

POTENTIAL CONSEQUENCES OF NO ACTION

- Short Term (1 to 3 years):

  - Deterioration of facilities increases
  - Ultimate cost to resolve the problem increases, because of inflation and possible fines by regulatory agencies
  - Public health hazards increase, through spread of illness and disease
  - Permits for new growth and expansion are denied for the service area
  - Enforcement and legal actions are brought against non-complying small communities

- Long Term (4 to 20 years):

  - Regulatory fines are imposed to enforce the standards
  - Higher costs are needed to remedy the problem
  - Chances for public health hazards become greater
  - Environmental deterioration is accelerated
  - Community decline is accelerated.

CONCLUSIONS

- Even with the maximum assistance in existing grants and low-interest loans, needed major sewer improvements very likely will not be built. The costs simply are not affordable to the local residents.

- Even with maximum grants and subsidies under the current available programs, communities smaller than approximately 200 households (500 people) cannot afford to pay for major sewer system improvements.

- Because the existing grant and loan programs are insufficient to bridge the affordability gap experienced by small Montana communities, additional grants or similar assistance become a clear and immediate public policy demand.

- Not only is public health and environmental quality threatened, failing septic systems and substandard sewage facilities affect a community's economic and employment growth or even stability. Over time, this causes an incremental shrinking of a community's economic base. The cumulative impact of decline in many communities is an overall decline in the state's economy.

MAJOR RECOMMENDATIONS

1. The most important action that the state and federal government can take to address this problem of affordability is to provide additional grant funds to small low-income communities for sewer improvements.

> *At the state level, the Governor's proposed Big Sky Dividend program could provide effective financing that would make sewer and other facilities affordable for small communities. Another opportunity to help make sewer facilities affordable would be to fully appropriate the grant funds authorized for the DNRC water development program.*

2. In addition to increasing the total amount appropriated under the various grant programs, the grant ceilings on individual projects should be changed so that grant amounts can be provided in relationship to a community's ability to pay.

3. The various state and federal sewer funding agencies should work together to offer small communities joint financing packages that bring the local share to a level that the residents can afford.

> *The agencies should coordinate their eligibility, application, ranking and other requirements to provide more effective overall financial assistance to small communities.*

* * *

The following document will take the reader through the wastewater financing issue, as it is seen by the people of four small Montana communities. The full report provides details on the "what" and "why" of these issues that will provide a better understanding of the dilemma confronting not just the progress, but the sheer survival of these and other small communities throughout Montana. The solutions cannot be postponed, be set aside for future consideration, or be ignored; to do so is in fact an action that will threaten the survival of Montana's towns.

I. INTRODUCTION

In St. Regis, a small unincorporated community in western Montana, one of the main restaurants will not be expanding this year because septic systems are failing, there is no land available for replacement drainfields, and no community sewer system. In addition to the loss of potential economic and employment growth, sewage from failing septic systems likely is contaminating wells in the community and is percolating into the Clark Fork River, according to health officials.

Constructing a community sewer collection and treatment system in St. Regis will cost nearly $3 million. A conventional revenue bond for the project would cost each household $161 per month just to repay the bond. Despite the residents' willingness to incur substantial sewer charges to deal with the problem, the community simply cannot afford to pay the cost of constructing the needed system.

St. Regis is one of the most dramatic examples of a small Montana community that needs a wastewater project that it cannot afford, but it is certainly not an isolated case.

The Montana Department of Commerce (DOC) and the Department of Health and Environmental Sciences (DHES) have found that many small Montana communities are having significant difficulty financing needed sewer facilities. In 1983 the Water and Sewer Agencies Coordination Team (WASACT) was formed. WASACT comprises the agencies and organizations that provide financial and technical assistance to local governments regarding water and sewer issues. WASACT tries to increase the effectiveness of assistance for water and sewer projects by coordinating grant and loan requirements, funding cycles, application procedures, and packaging financing for community projects.

The U.S. Environmental Protection Agency (EPA) recognizes that rural communities often are at a disadvantage in dealing with wastewater facilities. Not only does it cost more per gallon for small communities to collect and treat wastewater than it does for larger cities, but small communities usually have less management capacity and technical expertise, and have lower household incomes.

As part of its effort to address these problems, in 1988 EPA created the Small Community Outreach and Education (SCORE) program. The SCORE program assists small communities by providing technical assistance, emphasizing alternative and innovative technology, and targeting public and private financial assistance.

In 1989, the DOC, working with DHES, applied for and obtained a SCORE grant from EPA to examine the ability of small communities to pay for sewer system improvements. The project is to:

- assess and document the problem that small communities have in obtaining affordable financing to pay for sewer improvements;
- describe the affordability issue for federal and state policy makers;
- make recommendations that might guide the DHES and the Department of Natural Resources and Conservation in designing the new state revolving fund (SRF) for financing sewer system improvements;
- assist four selected case study communities in planning and financing needed wastewater improvements.

The DOC and DHES retained a financial contractor, Jim Richard of Business Services, Inc., to conduct research, work with funding agencies and private organizations offering technical assistance, and produce a report of the findings. The departments also formed an integrated assistance team to meet with the selected case study communities and help them begin the process of addressing and financing sewer system improvements. The assistance team was made up of representatives from DOC, DHES, DNRC, the Midwest Assistance Program, Montana Rural Water Association, and the contractor.

Four Montana communities of less than 2,500 population were selected as case studies, based on their need for wastewater improvements. The communities are generally representative of small communities throughout Montana. In meeting and working with each of the communities, the assistance team was able to provide help in dealing with proposed sewer improvements. The team also analyzed the communities' needs for financial help, suggested potential sources of funding, and calculated likely user rates under different funding scenarios. Engineering design alternatives for each community were discussed, including alternative and innovative technologies.

II. VALUE AND BENEFITS OF ADEQUATE WASTEWATER SYSTEMS

In Stockett, a small community in Cascade County, raw sewage reaches the surface of a marshy area in the center of town. The area has become a sewage pond. The community experiences the nuisance of objectionable odor during summer months. In addition, untreated sewage pollutes Cottonwood Creek that flows through the community. In much of the community of Somers, homes have been built over bedrock on small lots. Many of the septic systems are failing, which causes septic effluent to reach the surface within the community, and sometimes enters Flathead Lake. In Arlee, local health officials are concerned that failing septic systems are contaminating domestic water wells. In St. Regis, state and local health officials fear that sewage effluent from failing septic systems is both contaminating wells and entering the Clark Fork River.

Consequences of Improper Sewage Treatment

Together, these four communities demonstrate most of the types of problems associated with improperly treated sewage. Unfortunately, many citizens take sewage disposal and treatment for granted. Most simply flush their toilets and don't consider the possible consequences. Few people think of the importance of proper wastewater treatment and collection in terms of:

- Reduction of health hazards. Improper treatment, or lack of hydraulic capacity may result in sewer backups, diversions of raw sewage to receiving streams, and outbreaks of hepatitis, cholera, and other water-borne diseases.
- Impacts on water quality of receiving streams. Recreational and other uses of surface water may be greatly affected by the quality of wastewater effluent.
- Economic development. Business location decisions and the feasibility of expansion are affected by the availability of adequate wastewater facilities.
- Environmental Quality. Sewage pollution degrades the quality of surface and ground waters, destroying the aesthetic, recreational, and property values enjoyed by Montanans and visitors.

Public Health Problems

"Montana has a number of situations where raw sewage reaches the surface or enters streams, and these are real public health hazards."

– Dick Pedersen, DHES/Water Quality Bureau.

Dick Pedersen is concerned about children playing near the surfacing sewage and contracting disease in Stockett, Somers and other communities that have surfacing sewage. He adds:

> I am also concerned about the addition of organic matter from untreated sewage effluent entering streams and ponds and depleting oxygen, which could kill fish and plant life. Failing septic systems have the potential to contaminate ground water, particularly with nitrates, which can reach levels sufficient to cause methemoglobinemia, or "blue baby syndrome."

Health officials and doctors have understood the connection between untreated sewage and disease for decades. The public health effects of improperly treated sewage are well known. The Journal of

Environmental Health[1] describes how sewage waste can transmit disease-causing bacteria and viruses. According to the Journal, known diseases that may be spread through wastewater effluent include typhoid, cholera, dysentery, polio and hepatitis.

Not only does untreated sewage effluent present human health hazards, it is a significant cause of water pollution. According to a training manual prepared by California State University, Sacramento,[2] domestic wastewater contains both organic and inorganic materials. The organic matter, through action by aerobic bacteria, depletes dissolved oxygen, a condition that can kill fish and other living animals and plants. Oxygen-depleting matter also generates unpleasant odors. Inorganic materials and solids in sewage create sludge that accumulates on stream banks and stream beds; some wastewater solids rise to the water surface and form a floating scum that can contaminate a stream or lake, and certainly diminishes the aesthetic values.

In addition to ensuring public health, protecting streams and lakes, and contributing to pleasant communities, proper wastewater management is critical to economic development and business growth in a community. The economic development consequences of inadequate sewage treatment is illustrated by circumstances in the communities of Arlee and St. Regis. Because of failing septic systems on small, crowded lots and the lack of proper wastewater treatment, permits for new residential and business construction are being denied in Arlee. Permits for expanded or new businesses are being denied in St. Regis because present septic systems are failing and no land is available for replacement drainfields.

Adequate community water and sewage systems are prerequisites for economic and community development. For example, the Council of State Community Affairs Agencies (COSCAA) observes in its January-February, 1990 Newsletter[3]:

> .... public facilities, especially for localities less than 5,000 in population, are often a prerequisite for other community development activities. It makes little sense, for example, to rehabilitate houses if houses are not served by adequate drinking water or sewage treatment systems. Also, it makes little sense to try to create employment opportunities through business financing if basic community-wide infrastructure is nonexistent or inadequate.

III. THE NATURE AND SCOPE OF THE AFFORDABILITY PROBLEM

According to the Council of Infrastructure Financing Authorities (CIFA)[4] the EPA estimated in 1986 that nearly 70 percent of the nation's small community wastewater systems were not meeting discharge standards, and that capital needs for new or upgraded facilities were the primary cause of this noncompliance. The need to deal with sewage treatment problems is only one of a number of factors that affect a small community's ability to pay for sewer projects. Other factors include a reduction in financial assistance programs and high costs to construct sewer system improvements.

Because of their small size, communities of less than 2,500 population are more severely affected than are larger communities. COSCAA[3] points out:

> **The reason the current and proposed environmental regulations hit the smallest communities so much harder is easy to understand. These small communities have much lower household incomes than larger communities; they cannot take advantage of economies of scale; they have fewer people to help pay for the treatment; and they are much further behind the larger localities in the efficacy of treatment systems, if any, they currently have in place.**

A 1988 EPA report, A Preliminary Analysis of the Public Costs of Environmental Protection: 1981–2000[5] examined 85 recent and forthcoming environmental regulations that deal primarily with waste disposal and drinking water, and concluded:

- The largest potential increase in average annual costs per household will occur in localities under 2,500 persons, which will experience an increase of $170 in annual costs.
- About 26 percent of all localities under 2,500 in population will be unable to finance treatment systems using revenue–backed bonds or loans if the ratio of user charge to household income is kept at the current standard of one percent.
- Thirty percent of localities with populations less than 2,500 would be unable to finance needed treatment from general revenues.

"These small systems have very poor economies of scale. They have difficulty getting financing; they typically have poor overall management; and have only part–time and poorly qualified operators. Their revenue is inadequate and often uncertain."

– Michael Cook, Director, EPA Office of Drinking Water

Reduction in Financial Assistance Programs

The CIFA report[4] outlines the problem on a national level. According to the report, EPA funding for wastewater construction grants declined by 91 percent from 1981 to 1987. During the same time the federal grant share of a project was reduced from 75 percent to 55 percent, and the number of eligible communities was reduced also. The EPA has estimated that $83.5 billion should be spent for wastewater treatment facilities by the year 2008, yet the EPA construction grant program has been authorized at only $2.4 billion annually through 1992. No grants will be offered after 1992.

Similarly, the water and wastewater grant and loan program of U.S. Farmers Home Administration (FmHA) was reduced from $1 billion nationwide in 1981 to $455 million in 1989. The overall cuts stimulated a trend to fewer, smaller loans in the FmHA program, and a shift of grants and loans to more financially capable communities.[3]

The Situation in Montana

In Montana, small communities reflect the national trends. In 1984 the Governor's Infrastructure Task Force[7] evaluated 200 public wastewater systems. The study estimated that Montana's existing wastewater systems had a monetary need of more than $230 million for repairs, replacement and construction. When the need for new central sewer systems is considered, the financial need will be approximately $350 million, according to state Department of Commerce estimates.

Montana's allocation of funds from the EPA construction grant program has been reduced from $10 million in 1980 to zero in 1990. Montana's funding under the Community Development Block Grant program of the U.S. Department of Housing and Urban Development (HUD) has been reduced from $6.3 million in 1983 to $5.2 million in 1990. The expenditures for water and sewer facilities in Montana under the Farmers Home Administration's water and wastewater grant and loan program have declined from $5.8 million in 1981 to $2.8 million in 1990. (It should be noted that the CDBG and FmHA monies do not fund sewer projects exclusively. Only a portion of the annual allocations is available each year for wastewater projects.)

Montana's existing state-funded water development grant program, administered by the DNRC, could receive, under current authorization, approximately $6 million per year from the Resource Indemnity Trust account, interest income, coal severance tax funds, and other funds under current authorization. However, only $800,000 has actually been appropriated and spent on water development projects during each of the last two biennia. The remaining $5.2 million has been used to help balance the state general fund budget. An average of 2-4 sewer projects have been funded per biennium since the beginning of the water development and resource development programs.

Circumstances Affecting Affordability in Montana

Three circumstances often combine to create a problem of affordability for small communities facing sewer improvements costs. The first is that even in small communities sewage collection and treatment systems are very expensive to construct. Soil conditions, terrain features, presence of bedrock, or scattered development also can create high costs of construction, or can prevent the use of innovative, new technology that otherwise could lower costs. Where one or more of these adverse conditions exist, the cost of a sewer system can be as high as $3 million to serve a small community. As an example, a 1980 Facilities Plan for the community of St. Regis estimated that the cost to provide a central wastewater collection and treatment system would be $2 million. In 1990, the engineering estimate to construct a community wastewater system is $3 million.

The second circumstance is one of small economies of scale. The cost of a sewer project must be divided among a small number of households, and therefore each household bears a large financial burden. Also, small communities have limited tax bases and revenue funds, which makes sewer system financing more difficult. In small cities and towns the expertise and professional staff often are not available to work with funding agencies, bonding companies and engineers. Generally, small

communities also have a higher percentage of low income households.

The third part of the affordability problem is that small communities not only face needed wastewater improvements, but at the same time they face pressing needs to upgrade water systems and solid waste facilities, both to address public health problems and to meet new requirements. Therefore, a local government cannot put all its resources into sewer improvements, however pressing, because of legal pressure to improve water and solid waste facilities. The need for water and solid waste improvements magnifies the affordability problem of upgrading wastewater systems.

In Montana, one-third of the state's population lives in communities of less than 2,500 people. These are the people that EPA and other agencies recognize will bear the heaviest per household burden in bringing their sewage treatment facilities into compliance with health standards.

Potential Consequences of No Action

If communities that need sewage improvements take no action because they cannot afford the costs, they face a number of potential consequences, including:

- Public health hazards may increase, through spread of illness and disease;
- Environmental deterioration is accelerated;
- Deterioration of exising facilities increases with time;
- Regulatory fines and legal actions are imposed against non-complying communities;
- The ultimate cost to resolve the problem increases, because of inflation and possible fines by regulatory agencies;
- Permits for new growth and expansion are denied for the service area; and
- Community decline is accelerated.

IV. CASE STUDIES

The DOC and DHES formed an interagency task force to accomplish two purposes:

1. bring a team of experienced people to four selected small communities to work with the local officials in financing needed sewer improvements; and
2. learn from first-hand experience in those communities how well local people are able to deal with the issues of financing sewer improvements.

The assistance team comprised representatives of DOC, DHES, DNRC, Midwest Assistance Program, Montana Rural Water Program, and the project contractor. The team went to each of the case study communities, met with local officials, planners, and health personnel, discussed the wastewater problems, possible solutions and possible means and procedures for financing the improvements, and helped to determine likely user fees. By working in the four communities, the team received a first-hand understanding of the problems and opportunities facing small communities that need substantial sewer improvements, and was able to help local officials develop strategies for dealing with the problems.

The DHES selected the four case study communities based on their need to deal with sewage problems. The circumstances of each community are described below.

Arlee

Arlee is an unincorporated community with 240 residents located on the Flathead Indian Reservation in Lake County. The community has 59 percent low and moderate income households, comprising mostly retired persons, elderly residents and single mothers. The district has approximately 95 households.

Most of the lots are 50 by 140 feet, with on-site wells and septic systems. Because of the small-sized lots, there is only 25-50 feet separation between wells and drainfields, compared to the minimum required 100 foot separation. Also, many of the septic tanks are of improper construction (e.g., using 55 gallon drums). Although no health problems related to sewage disposal have been formally documented, state and county officials recognize Arlee as a potential health hazard.

Because of the potential health hazard in Arlee, Lake County health officials will not approve any additional water or sewer permits within the community until a proper central wastewater system is constructed. As a result, virtually any proposed new residential or business development is prohibited within the community at the present time. This situation has prevented Arlee from enjoying any economic growth or business expansion.

State health officials estimate that a treatment lagoon with rapid percolation and a gravity collection system would cost approximately $1,071,000. If that cost were financed through a conventional revenue at 7.5 percent interest over 20 years, the financing would cost each of the 95 households $100 per month in debt service and bond issuance costs. The O&M costs are estimated at $10 per month, and with $1 per month for future replacement, the total user fee in Arlee would be $111 per month (see Figure 1). Lake County could apply for grant assistance under the CDBG program and

the DNRC water development program for Arlee. If Arlee were able to receive a $350,000 CDBG grant and a $100,000 DNRC grant, and finance the balance through the state revolving fund (SRF) at 3 percent interest over 20 years, the total monthly user fees for debt service, O&M and replacement would be $51 per household (see Figure 1).

Arlee may be able to obtain a $300,000 grant under the Indian CDBG program. If that grant were combined with the state CDBG and DNRC grants, the total monthly user fee could be reduced to $32 per household. This is a "best case" finance package, and would be difficult to assemble because (1) the CDBG, Indian CDBG and DNRC grant programs are highly competitive, and (2) differing application cycles, grant requirements, and timing of awards under four different programs make coordination very complex.

A $51 per month user fee clearly is unaffordable. Even a $32 per month user fee (possible only with the unlikely packaging of four different financing programs) may not be acceptable in Arlee.

"The people in Arlee just aren't able to afford $32 a month. We might be able to sell a fee of $25, but it will be very difficult."

– Gary Wining, Chairman of Arlee Sewer District

The CDBG program uses the criterion that a community should be able to pay one percent of its median family income in annual sewer fees. Arlee's best case user fee of $384 per year per household ($32 per month) is almost three times the affordable threshold of CDBG, which would be $136 per year ($11 per month) under the one percent of median family income criterion.

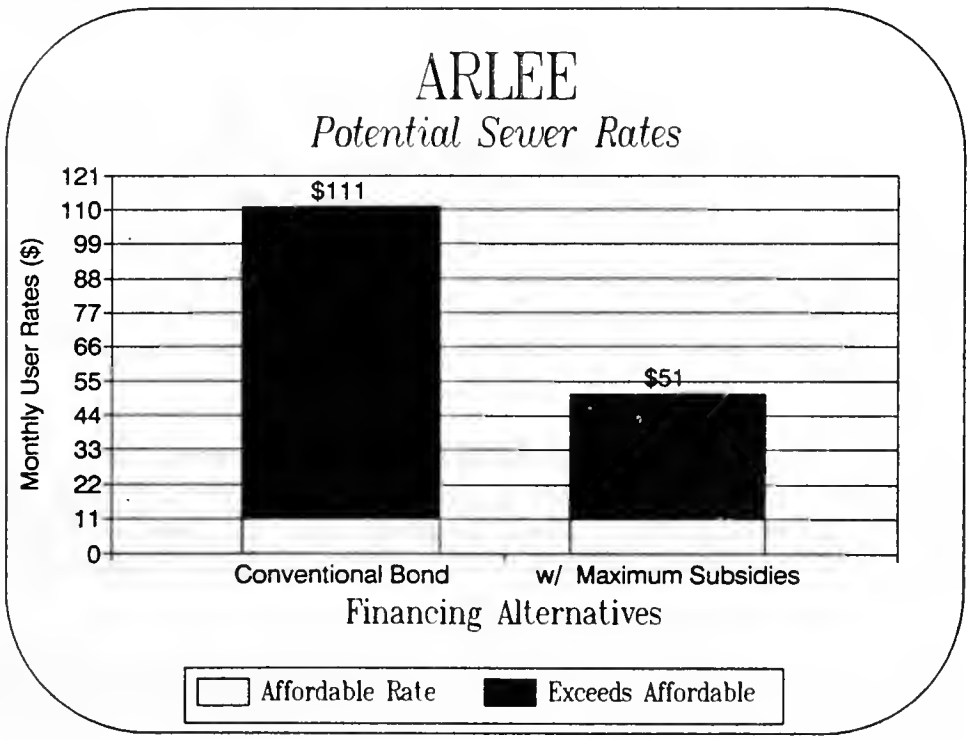

Figure 1

Somers

Somers is an unincorporated community located on the northwestern shore of Flathead Lake in Flathead County. The community has 250 households and a population of 850. Somers is an economically stressed community with a low median household income and more than 73 percent of the households are in the low-moderate income range. Currently the residents pay a base water rate of $20 per month, and $16 per year for garbage collection. In addition, the taxpayers in Somers pay 279 mills in county and school district property taxes.

Residents now use individual septic systems. Much of the community is located in an area of exposed or very shallow bedrock. As a result, many of the septic systems do not function properly, and in some areas, raw sewage reaches the surface. The need for a community sewer system is critical.

Because of the presence of bedrock, constructing a community wastewater system will be expensive. A septic tank effluent pump (STEP) system was considered, but too many of the septic systems are made of wooden cribs or other substandard devices. A small diameter gravity system is proposed to connect to the Lakeside transmission line. The total cost of designing and constructing a collection system and connecting to the Lakeside sewage transmission line is estimated to be $2,850,000.

In addition to the construction costs for a sewer system, the DHES estimates that the district would need to charge approximately $17 per month for operation and maintenance (O&M). The district also should consider establishing a replacement fund to help pay for future replacement costs. A suggested charge of $1 per month per household is used here as a means of building a replacement fund. A revenue bond (at 7.5% over 20 years) to fund the construction and pay the costs of issuing the bond would cost $101 per month per household. With $18 per month for O&M and replacement, the total costs would result in a monthly sewer charge of $119 per month (see Figure 2).

The DHES has offered Somers an EPA grant of $1.4 million (The grant is one of the last EPA construction grants). With the EPA grant the balance would be reduced to $1.45 million. Because Flathead County has existing CDBG commitments from the Department of Commerce, the county is ineligible to apply for CDBG assistance for Somers this year. Somers can apply for a loan from the Department of Natural Resources and Conservation water development program. Under this program, a low-interest loan of approximately 5 percent interest, based on community need, could be obtained for the first five years. Packaged with the EPA grant, a 20 year bond for $1.45 million at 5 percent interest plus bond issue costs, O&M and replacement, would require a monthly fee of $60 per household.

The Legislature could offer Somers a 5 percent bond over a 30 year term. The total monthly fee per household with the EPA grant and a 30 year bond at 5 percent would be $34. Under the best financing package currently available using EPA grant monies, and DNRC low interest loans, the sewer rate realistically could be reduced from $119 to $52 per month per household to cover bond debt service, O&M and replacement (see Figure 2).

Even with the maximum assistance in grants and low interest loans, Bob Foley, chairman of the Somers Water and Sewer District, believes that gaining community support for the project at $52 per month per household is not possible.

"I think the people in Somers would be willing to support the sewer project if the rates were in the low $20's. But there is no way they will accept $52 per month."

– Bob Foley, Chairman of Somers Water and Sewer District

Under the CDBG criterion that a community should be able to afford to pay 1% of its median family income in annual user fees, a household in Somers could afford to pay $183 per year, or $15 per month. The $52 per month charge that Somers' residents face with maximum grants and subsidies is more than three times the amount affordable under the CDBG criterion.

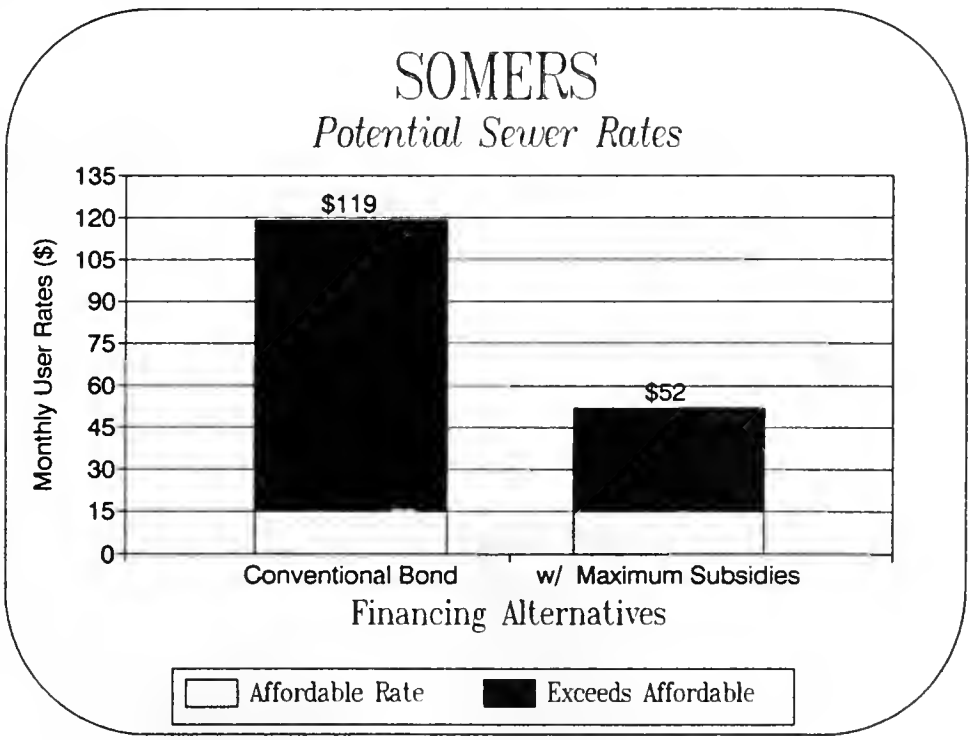

Figure 2

St. Regis

The unincorporated community of St. Regis, located in Mineral County, has a population of 300. There are approximately 150 households and businesses in the community. All are on individual wells and septic tanks on small lots. A significant number of septic systems have failed. The DHES believes that the lack of separation between septic tanks and wells creates the possibility of well contamination. Also, sewage has reached the surface, and there is the possibility of sewage entering the Clark Fork River. The DHES believes that the situation in St. Regis creates a critical need for a wastewater collection and treatment system.

St. Regis does not have a current facilities plan, but several alternative collection systems are under

consideration. The cost for a lagoon and collection system is estimated to be approximately $3 million. A conventional revenue bond at 7.5 percent interest would require each household and business to pay $177 per month just to retire the bond. When operation, maintenance, and replacement costs are considered, an additional $16 per month would be needed. The total user fee would be $193 per month per household (see Figure 3).

Using an SRF loan of 3% over 20 years, a monthly user fee of $124 per user would be necessary to pay the debt service. Adding $16 per household for operation, maintenance and replacement would result in a total user fee of $140 per household per month.

If St. Regis could obtain both a $350,000 CDBG grant and a $100,000 DNRC grant, the amount of financing would be reduced to $2,550,000. A 20 year SRF bond at 3 percent interest would require a monthly user fee of $95, and with operation, maintenance and replacement the total user fee would be $111 per household per month (see Figure 3).

Even with this financing package that uses maximum available grants and subsidies, the $111 monthly user fee simply would not be affordable for the residents of St. Regis. The $888 annual user fee per household is five times greater than the CDBG threshold of one percent of St. Regis' median family income (currently $16,860), which would be $169 per year per household.

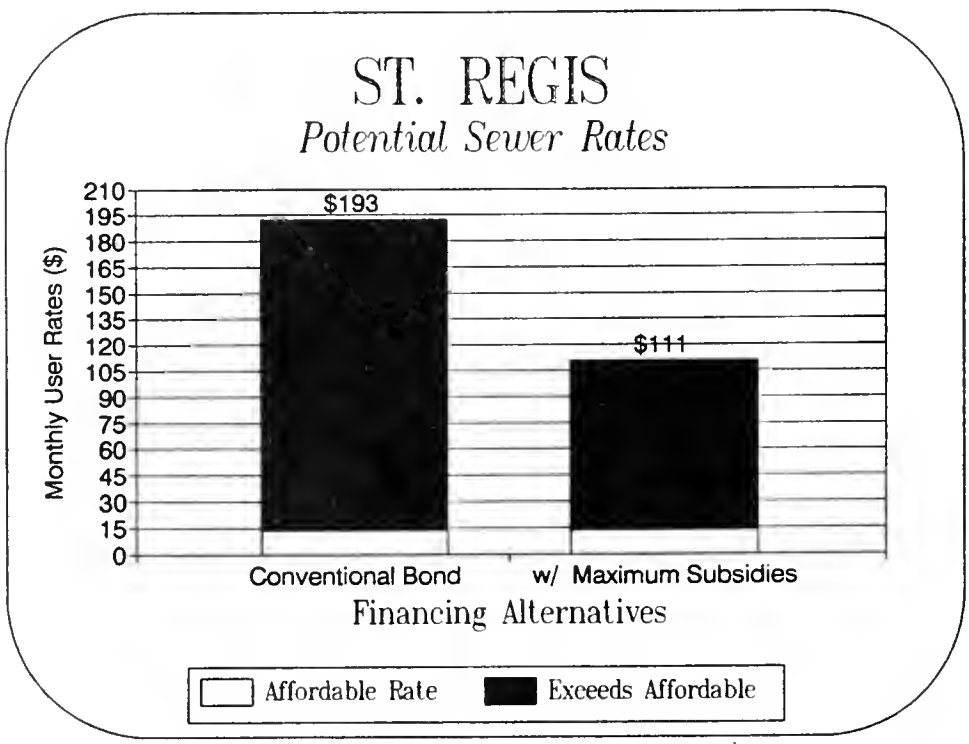

Figure 3

Stockett

Stockett is an unincorporated community in Cascade County with a population of approximately 260. The community has a high percentage of elderly and low income residents. Twenty of the 100 households are on a community collection system that flows into a common drainfield. The drainfield discharges into a marshy area near the center of town. Another 20 households connect to a community septic system that overflows into Cottonwood Creek. The remaining 60 households are on individual septic systems.

Currently, raw sewage is surfacing in a marshy area, which creates, in effect, a cesspool pond. The pond presents a potential public health hazard from possible water borne diseases. During the summer months offensive odors from the pond are a nuisance to residents. The DHES considers the situation of surfacing sewage at Stockett one of the worst potential health hazards in Montana.

The DHES estimates that a collection system with a lift station and lagoon with irrigation would cost in the range of $1.2 million. To pay for the system using a conventional revenue bond at 7.5 percent interest, each household would have to pay $107 per month. With an additional $16 per month to pay for operation, maintenance and replacement, the total user fee would be $123 per month (see Figure 4).

The DHES is offering Stockett a grant of $329,000. If the community were to attempt to pay for the balance with a conventional revenue bond, each of the households would pay $77 per month just for debt service. User fees for operation, maintenance and replacement would be approximately $16 per month, so Stockett residents would face a total monthly sewer charge of $93.

A "best case" funding package for Stockett would include the DHES grant, a $350,000 CDBG grant and a $100,000 DNRC grant, and financing the remaining $421,000 with an SRF bond at 3 percent interest. Even with the two grants and the low-interest bond, the total monthly sewer charge for debt service, operation and maintenance and replacement would be $42 (see Figure 4). In a community with a low median household income and a high percentage of elderly and low income households, the suggested sewage treatment system clearly is not affordable in Stockett.

"I don't think we could sell a fee of $25 a month to the residents in Stockett."
– Walt LaRonde, Chairman, Stockett Water Users' Association

The $804 annual user fee per household is more than five times greater than the CDBG threshold of one percent of Stockett's median family income of $14,276, which would be $143 per year per household.

Stockett is a small community comprising a high percentage of elderly and low income families that face unaffordable proposed sewer charges to construct a sewer system that will prevent potential health hazards.

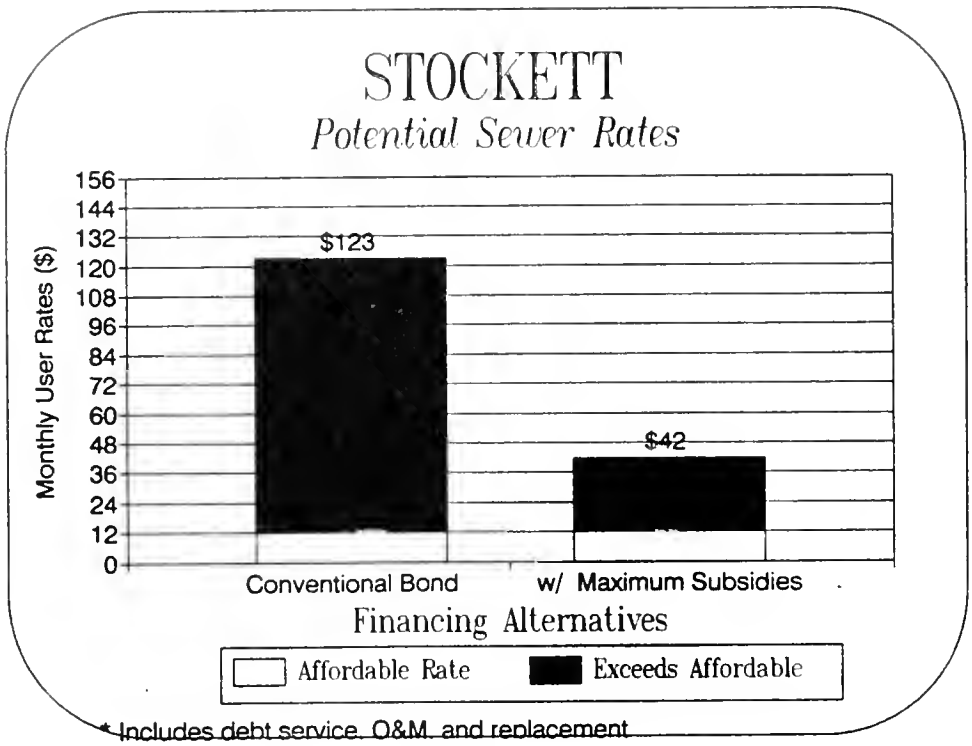
STOCKETT
Potential Sewer Rates
Monthly User Rates ($)
156
144
132
120
108
96
84
72
60
48
36
24
12
0
$123
$42
Conventional Bond
w/ Maximum Subsidies
Financing Alternatives
Affordable Rate
Exceeds Affordable
* Includes debt service, O&M, and replacement

Figure 4

V. MEASURING MONTANA COMMUNITIES' ABILITY TO PAY FOR WASTEWATER IMPROVEMENTS

The Concept of Affordability

The trend of small communities having to pay for a greater share of the cost to upgrade, replace, expand or construct wastewater facilities raises the question: how much can a community reasonably afford to pay for adequate sewage treatment? The concept of "affordability" suggests that there is a limit on how much households can reasonably be expected to pay for sewage facilities. Various approaches to quantify affordability are outlined below. **The ultimate definition of affordability in a community however, is provided by the residents: how much are they willing to pay for a sewer project, regardless of legal mandates?**

Local officials usually are more aware than is the general public of the need for sewer improvements and the consequences if nothing is done. Therefore local officials are more likely to accept increases in sewer rates as necessary, whereas the residents tend to resist significant rate increases. Perceptions of what is affordable varies with residents' understanding and acceptance of the need for wastewater improvements. The history of past user charges in the community also influences citizens' perceptions of what is affordable. For example, citizens tend to resist substantial rate increases in communities that have kept user fees low in the past.

Defining what is affordable, or conversely what is unaffordable, is not readily quantifiable. A large part of the difficulty lies in the broad spectrum of perceptions of need for improvements, and of how much residents can, or will, reasonably pay for improvements.

"Affordability" as Defined by Bonding Companies and Public Agencies

The various funding agencies and bond companies have developed thresholds that identify situations where a community may have difficulty in handling increased debt service and operation and maintenance costs. Many of these criteria suggest guideline thresholds beyond which a community may not reasonably be able to afford additional debt.

Bond companies. One bond company, D.A. Davidson and Company, uses the following guideline to determine whether a community should incur additional debt: the proposed bonded indebtedness for the utility would not exceed $1,000 – $2,000 per household.

Community Development Block Grant (CDBG). Montana's CDBG program has established two criteria for determining if a community needs CDBG assistance to finance a water or sewer project:

1. the annual average user rate for the utility would exceed 1 percent of the median family income of the community; or
2. the per household bonded indebtedness for the utility would exceed 8 percent of the median family income for the community.

Environmental Protection Agency (EPA). EPA has determined that a community would have difficulty financing sewer improvements if total annual costs per household would exceed:

1. 1% of median household income if the MHI is less than $10,000
2. 1.5% of median household income if the MHI is $10,000–$17,000
3. 2% of median household income if the MHI is greater than $17,000

Farmers Home Administration (FmHA). FmHA has a grant program to help financially stressed communities reduce user costs to a reasonable level. FmHA considers a community to be eligible for grant assistance if:

1. annual debt service per household would exceed 0.5 % of the community's median household income (MHI) when the MHI is below the poverty line (currently $12,100); or the annual debt service per household would exceed 1% of the community's median household income when the MHI is above the poverty line but is not higher than the state's non–metropolitan median household income (currently $15,420); and
2. the present sewage system presents a health hazard.

FmHA provides loans at low interest rates (5%) where the median household income is below the poverty level for a family of four, or below 80% of the statewide non–metropolitan MHI and the proposed facility is required to meet health standards. For communities whose median household income is higher than these thresholds, FmHA can provide loans at an intermediate rate that will be no higher than 7 percent.

Contractor's Recommended Definition of "Affordability"

As a result of this research, the author recommends that Montana state agencies adopt a standard definition to serve as a guideline for determining a community's ability to pay for wastewater system improvements. A state definition would foster consistency among the public funding agencies in providing grant and loan assistance. Also, a standard definition would help residents understand how their community's user rates compare with those of other communities. A standard definition should be quantifiable, readily determined, and related to the ability of individual households to pay for sewer improvements costs. Within any community residents likely will have a perception of their ability to pay that differs from a state standard definition. The goal is to develop a measurable standard that can be reasonably applied to all Montana communities.

Tied to the concept of a common definition of affordability, state and federal agencies should establish a minimum level of local financial commitment to fund sewer improvements. The local contribution expected from each community should be based on a sliding scale related to the state–wide definition of affordability. Any grant or low–interest loan would be provided only contingent upon a community committing to provide its minimum contribution. This requirement would result in more uniformity in local cost sharing, which in turn would help foster local willingness to provide a community's contribution.

The author has derived a concept for a suggested standard definition of affordability. Additional investigation is needed to substantiate the premises for the definition, but the basic approach could be applicable for funding of many public facilities. For purposes of developing a statewide definition of affordability, it is assumed that in a community the ability to pay is tied to income levels. Median

household income is a reliable measure, and the data are available down to a municipality level, although often dated because of the decennial census. The 1990 census data will be available in early in 1991.

A straight-forward indication of the ability of residents to pay the costs of sewer improvements is a comparison of a household's total obligation for user fees and local tax payments (municipal, county, and school) as a percent of income. **Under this approach, the threshold of unaffordability would be the point at which the sum of the total annual user fees plus all local government property taxes paid by a household on a house and lot would exceed a certain percentage of the community's median household income.**

Other definitions (e.g., CDBG, FmHA, EPA and DNRC) consider only the financial factors relating to the sewer system. The author's suggested definition considers other local government obligations that would affect a household's ability to support the cost of additional sewer improvements. A sewer user fee by itself may seem to be reasonable, but when combined with other local government fees and taxes the total burden may not be affordable.

The local user fees (i.e., water, sewer, solid waste) paid by households in a community are readily obtained from the county, municipality, or water/sewer district, or rural water association. Similarly, the total number of mills levied for county, municipal, school, and special districts is easily obtained from the county treasurer or assessor, or from publications such as those published by the Montana Department of Revenue or the Montana Tax Foundation.

To derive a statewide affordability threshold, it is necessary to select representative property tax payments and representative user fees (see box on following page). As a basis for a representative household tax payment the author used a house and lot with an assessed valuation of $40,000. (Based on his experience with housing rehabilitation projects in a number of small Montana communities, the author determined that a residence and lot assessed at $40,000 is near the high end of the price range for shelter owned by low and moderate income families.) At the residential tax rate of 3.86 percent, the taxable value for the representative $40,000 property would be $1,540. To determine a household's tax payment, the sum of the mill levies by the municipality, county, and school districts would be multiplied by $1,540. For purposes of deriving a state threshold of affordability, a total of 300 mills was used on the assumption that a total of 300 county, municipal and school mills was on the upper end of the range throughout Montana. Therefore, the representative household tax payment would be $460 per year.

For a representative water or sewer user fee the criterion of FmHA was used: that a utility's annual debt service equals or exceeds 1 percent of the median household income. At Montana's current non-metropolitan median household income of $14,954, the threshold annual user fees to pay the debt service for water or sewer would be $150. When $10 per month ($120 per year) per household is added as a reasonable charge to cover operation and maintenance of a utility, the representative user fee for debt service and operation and maintenance would total $270 per year for each utility (equal to $22.50 per month). Solid waste user charges in most Montana communities are ranging from $75 to $140 per year, so a representative solid waste charge of $100 was used in this derivation.

DERIVATION OF 7% AFFORDABILITY THRESHOLD

The following outline summarizes the components of the 7% threshold derivation:

annual water user fee:	**$ 270***	
annual sewer user fee:	**$ 270***	
annual solid waste fee:	**$ 100****	
Total user fees:		**$ 640**
Total mills:	**300*****	
x taxable value:	**$1,540**	
= Tax payment:		**$ 460**
TOTAL ANNUAL FEES & TAXES:		**$1,100**

Total annual fees & taxes ÷ MHI = _____%
$1,100 ÷ $14,950 = 7%

*** Derived from the FmHA criterion that a utility's annual debt service exceeds 1% of median household income; $10/month per household is added to pay for operation and maintenance of the utility (annual debt service of $154 + annual O&M of $120 = $270). That annual user fee is equivalent to $22.50 per month.**

**** Solid waste service charges in Montana are ranging from $75 to $120 per year.**

***** Three hundred total mills is at the high end of municipal, county,and school mill levies in Montana.**

The total of the representative user fees is $640 per year. The total representative tax payment per year is $460. The sum of the user fees and tax payments is $1,100 per year, which is 7 percent of the state non-metropolitan median household income. **Thus, the threshold at which a community could not afford additional debt would be that point where the sum of annual user fees plus tax payments is 7 percent of the community's median household income.**

The typical user fees and tax levies imposed by various units of local governments were used because these local tax and user charge obligations reduce a household's income available for additional local government debt. Assessments by special improvement districts or other special districts for projects that are not related to water, sewer or solid waste were not included because those assessments usually apply only to a specific neighborhood and not to an entire community. Including special district assessments in this affordability formula would be very difficult. More importantly, this formula provides a guideline for examining a community's ability to pay.

State and local officials must realize that a community's debt capacity may be needed for other needs in addition to sewer improvements. Funding agencies must examine a community's financing needs for all facilities and expect only a proportional commitment of its debt capacity for sewer improvements.

How the Affordability Definition Would Work

The following example shows how the proposed standard "affordability" definition would work for the community of Somers:

annual water user fee:	$ 240	
annual sewer user fee:	$ 0	
annual solid waste fee:	$ 16	
Total user fees:		**$256**
city/town mill levy:	0	
county mill levy:	102	
school mill levy:	177	
Total mills:	279	
Total mills	279	
x taxable value	$1,540	
= tax payment		**$430**
SUM OF FEES + TAXES:		**$686**

Because Somers' median household income is $14,258, its affordability threshold under the 7% definition would be $998. Households currently pay $686 in fees and taxes, so $312 ($998 – $686) is available per year for additional debt. A Somers' household would be able to afford $26 per month in additional fees ($312 ÷ 12).

VI. ANALYSIS OF SEWAGE SYSTEM FINANCING PROGRAMS IN RELATIONSHIP TO AFFORDABILITY

A number of state and federal programs are available to assist Montana communities in financing the cost of constructing sewer system improvements.

Environmental Protection Agency (EPA)

From 1984 until 1990, the EPA received funding for a construction grant program that provided 55 percent funding (prior to 1984 EPA provided 75 percent) for the highest ranking projects on the DHES priority list. Montana's allocation of approximately $6 million annually limited the number of communities that were benefitted each year. The EPA grant program was the basic sewer system funding program because, at 55 percent of project costs, it provided a substantial portion of the funding for those communities that ranked high enough in each year to receive funding.

Beginning in 1990, EPA will provide an allocation to each state to establish state revolving loan funds (SRF). Over the next six years, Montana will receive $38 million in federal funds and provide $8 million in state matching monies. The Department of Health and Environmental Sciences (DHES) and the Department of Natural Resources and Conservation (DNRC) will manage Montana's SRF. The DNRC and DHES are proposing to use the funds to purchase low-interest bonds issued by communities for wastewater improvements. As proposed, the bonds would have a 20 year term and carry interest rates of approximately 3 to 5 percent.

In addition to repaying the principal and interest on the bonds, recipient communities would be required to carry a reserve fund, which could be paid from user fees, bond proceeds, or other local funds. Communities that use the SRF program would have to set user fees high enough to generate funds to properly operate and maintain the sewer system.

The following example shows the potential benefit if an SRF bond were offered at 3 percent interest. A community of 1,000 population typically will have approximately 400 sewer users. A sewer improvements project costing $1 million would require each household to pay $20 per month for the debt service on a conventional 7.5 percent revenue bond. If the same project in that community were financed with a 3 percent SRF bond, each household would pay $14 per month for debt service.

Other costs associated with a sewer project (bond issuing, bond reserve, operation and maintenance) typically range from $10-15 per month per household, according to the DHES. In the example above, if $10 per month per household in associated additional costs is assumed, the SRF could reduce the total sewer user charge from $30 per month to $24 per month. Based on perceptions of leaders in the case study communities, $24 per month might be acceptable to residents, where $30 per month probably would not.

As another example, in a smaller community with 100 households (or a population of 250) a $1 million sewer project financed with SRF bonds would require each household to pay $56 per month just for debt service. To cover the associated costs, a monthly sewer rate of approximately $66 would have to be charged each household.

In a community with 400 users, the SRF financing may provide affordable financing for a $1 million sewer project (depending on the other local government fees and taxes). However, in a community of only 100 users, the $66 per month rate is beyond the ability of residents to pay.

Community Development Block Grant (CDBG)

The Community Development Block Grant program, administered by the Department of Commerce, provides grant funding up to $375,000 for a project. Under the program, funding is awarded once each year, and competition among communities for CDBG monies is very intensive.

The ranking criteria used by the Department of Commerce encourages communities to provide at least 25 percent of the project cost in local matching funds. However, this standard is waived for communities where the bonded indebtedness per household would be more than eight percent of the median family income, or where the annual sewer user fees would be greater than 1 percent of the median family income.

Since 1985 the department has funded an average of two sewer projects per year. The communities receiving CDBG for sewer projects have provided an average of 2:1 matching funds for the CDBG funds. Those matching funds have been provided primarily by EPA construction grant funds and by local bond issues or other granting agencies.

Several local officials commented that the CDBG program should allow a county to submit more than one application per year. Currently, CDBG allows a municipality or county to submit only one application per year.

The CDBG program recognizes the issue of ability to pay through its waiver of the 25 percent match requirement. However, the $375,000 ceiling per project bears no relationship to the actual needs for assistance required by the community. Often, the participation of CDBG monies still does not bring the cost of sewer improvements within reach of a community's ability to pay, and additional outside assistance is needed.

Farmers Home Administration (FmHA)

The Farmers Home Administration has a combination grant and loan program. This program allocates grants and loans to a community based principally on the ability to pay. FmHA offers a community a grant in an amount that will bring the annual debt service to 1 percent of the median household income (MHI). For the balance of the project cost, FmHA provides loans at 5 percent interest to communities with a median household income of less than 80 percent of the state MHI. For communities with a median household income between 80 percent and the state MHI, loans at 6 percent are made. The FmHA provides loans at 7 percent interest for communities with median household income above the state MHI.

A number of local officials expressed frustration that FmHA funding approval can take a substantial amount of time. In some cases the delays in approval, which can be a year or longer, have prevented packaging FmHA assistance with other programs, and also have increased the overall costs of projects.

Department of Natural Resources and Conservation (DNRC)

The DNRC receives monies from interest on the coal severance tax, Resource Indemnity Trust account and other sources to provide grants for renewable resource development and water development projects, including sewer improvement projects. For construction projects, grants can be used to fund no more than 25 percent of the total project cost, with a ceiling to $100,000 for drinking water and sewer projects.

Under the loan program, DNRC offers low interest loans to local governments for water development projects, including sewer system improvements. The funding for DNRC's water development loan program is generated by the sale of bonds that are secured by the full faith and taxing authority of the state or by coal severance tax revenues. The interest rate for the loans to communities is tied to the interest rate of the DNRC bond issues. The interest rates on those bonds have been ranging between 6 and 7 percent.

The local bonds are typically issued for 20 year terms, although the term can be extended to 30 years for financially stressed communities. The bonds can carry an interest rate as low as 4 or 5 percent for financially stressed communities. Usually the reduced interest rate is in effect for the first five years, then the regular interest rate is paid for the remaining life of the bond. However, the interest subsidy can be provided for terms longer than five years. A sliding scale is used to determine the amount that the interest rate is lowered:

1. if total user fees are 1 to 2% of median household income, the interest subsidy is 1%;
2. if total user fees are 2–4% of median household income, the interest subsidy is 2%;
3. if total user fees exceed 4% of median household income, the interest subsidy is 3%.

Both the grant and loan programs are on a two–year funding cycle. The grant program is competitive among applicants, and the demand for grant funds is substantially greater than the funds available. Loan applicants that meet the eligibility criteria generally are funded. Final decisions on grant awards and loan terms are made by the Legislature. Because grants and loans can only be approved in biennial legislative sessions, packaging DNRC funding with other financing programs can be very difficult.

The DNRC loan program recognizes a community's ability to pay in that the Legislature can reduce interest rates and extend the terms of the bond for financially stressed communities.

Comment: Current Programs and Affordability

All of these grant and loan programs help make sewer projects more affordable for small communities compared to financing through conventional bonding. However, the grant ceilings for individual projects and the debt service required under even very low–interest loan programs often do not bring the local share of the project cost within affordable reach of small communities facing expensive sewer costs.

Communities with fewer than 1,000 people cannot afford to pay the debt service for a typical $1 million sewer system even with low–interest bonds available through DNRC or the SRF.
Even where a community might obtain either a CDBG or DNRC grant, or both, the $375,000 and

$100,000 ceilings on the respective grants leave a substantial balance on a $1 million sewer project for a community to pay with local funds.

The FmHA truly addresses the issue of affordability by setting up a grant and loan arrangement that uses a grant to reduce the debt service to an amount the community can afford. Unfortunately, the total funding allocations for Montana projects under the various grant programs are insufficient to meet the extensive needs for sewer improvements in the state. A total of only five or six sewer projects are funded each year under the CDBG, DNRC and FmHA grant programs.

Typically, the communities that have financed sewer improvements have combined several of these programs to bring the community's cost within reasonable affordable reach. However, because of declining funding levels, different funding cycles, application and eligibility requirements, many communities find it increasingly difficult to assemble a finance package using a combination of the programs. Also, as illustrated by the case studies in Section VI, **even with maximum grant and loan subsidies currently available, many small communities simply cannot afford the costs necessary to construct needed sewer improvements.**

VII. AFFORDABILITY AND THE NEW STATE REVOLVING FUND (SRF)

The EPA's change from a construction grant program to a state revolving fund (SRF) will significantly affect the affordability of sewer projects in many Montana communities. Even for very small communities with 100 or fewer households a sewage collection system and lagoon often will cost in the range of $1 million. On the assumption that people will resist paying user fees that exceed $25 per month, and that at least $10 of that monthly fee is needed for operation and maintenance, a maximum of about $15 per month per household typically is available for debt service. A 20 year SRF bond at 3 percent interest for $1 million plus bond reserve and issuing costs would require a community to pay $6,200 in monthly debt service. With $15 per household available for debt service, a community would need 410 households to repay the bond.

Even if the SRF bond were issued with zero percent interest, a community would need 300 households to pay the monthly debt service. **For communities with fewer than 300 households, financing almost any type of sewage collection and treatment system becomes unfeasible without significant grant subsidies, even with an interest-free bond.** A $350,000 grant through the CDBG program would reduce the bond amount and required debt service to a point where a community with 270 households could handle a 3 percent bond. A $100,000 DNRC grant combined with $350,000 CDBG award would place a 3 percent SRF loan within reach of a community of 225 users.

Communities with fewer than 200 households (approximately 500 population) simply cannot afford the debt service for the cost of the basic sewage collection and treatment system, even with maximum subsidies from CDBG and DNRC.

Suggestions For Making the SRF More Affordable For Small Communities

Several measures could be taken to design the SRF loan program in a manner that would help make sewer improvements more affordable for small communities. For instance, the SRF should be flexible so that the financing terms for each community can be based on the community's capacity to pay the debt service. The SRF should allow flexibility for small communities, by providing for bonds with 0–3 percent interest rates or terms longer than 20 years. Although the term of the loan should not exceed the expected life of the facility, most lagoon plants have a practical expected life of more than 20 years, and longer terms could be authorized for very small communities. **Extending the term of the bond is more effective in reducing annual debt service (and thus monthly user fees) than is lowering the interest rate. As an example, for a $1 million bond at 3 percent over 20 years, a community would incur an annual debt service obligation of $67,000. The same bond at 2 percent interest over 20 years would require $61,600 in annual debt service. The $1 million bond at 3 percent for 25 years would require only $57,000 annually.**

The SRF should allow small communities to use dedicated revenues other than user fees to repay the bonds. Although a community should be cautious in selecting revenues to commit to debt retirement, the SRF should not prevent repayment by revenues unrelated to the project.

VIII. HOW TO MAKE PROJECTS MORE AFFORDABLE

The analyses of the four communities used as case studies and of the existing funding programs show that additional state and federal grants is the single most effective action to bring the cost of major sewer improvements within the ability of small communities to pay. Local and state government can take other steps to help make sewer improvements more affordable for local residents. The measures available to local officials fall into three categories: reducing the project cost; securing more favorable financing terms; obtaining public understanding and acceptance of the project and costs. State government can help make sewer improvements more affordable by making technical assistance available, and by reviewing existing state requirements to see if any opportunities might be available to allow and encourage less costly alternative systems.

Reducing Project Costs

Although it is extremely difficult for citizens to distinguish among applicants offering engineering services, the engineer that is finally hired will have a great influence on the design of the system, and, thus, on the final project cost. Selecting an engineer is one of the most important actions a community will take throughout a sewer project, yet is a decision that most small communities are poorly prepared to make. Fortunately, a number of public agencies and private organizations offer excellent help in selecting an engineer.

Today's technology and research offer new approaches and techniques for handling and treating wastewater that can mean lower costs for communities. As an example, the community of Absarokee in Stillwater County was able to meet state effluent standards by adding ultra-violet treatment to its sewage discharge at a cost of $30,000. Even with on-going operation and maintenance costs, this technique will be less expensive in the long term than the conventional alternative of building a new, larger lagoon system that would have cost more than $1 million.

The EPA is devoting much effort to the further development and use of alternative sewage treatment systems. Many of these alternative systems already are proving to be less expensive, effective means of addressing wastewater treatment for small communities. The EPA has issued a number of publications describing the available alternative systems, their installation, and where they are appropriately used. Engineering consultants need to consider more innovative and non-traditional approaches. Regulatory agencies also need to be able to allow sufficient flexibility to enable these systems to be built. For example, the "Ten State Standards" now used to approve sewer projects might be re-examined to find possible opportunities for greater flexibility.

Communities and their consulting engineers should consider less capital-intensive solutions to sewage management. Such solutions might include phasing improvements or using design innovations. However, communities also need to understand the long term, on-going annual costs for proper operation and maintenance of alternative systems. Some wastewater treatment facilities cost less to construct, but are more costly to operate. For example, smaller lagoon cells can be constructed at less cost, but chlorination or aeration systems must be added, and the mechanical equipment can be costly to properly operate and maintain year after year. The community should find the solution that will be least costly over the life of the system. Also, the community, with its engineer, should select technology that is within its capacity to properly operate.

Counties and municipalities can save money by performing some of the work associated with installing a sewer system. For example, the local government can re-surface streets and alleys and reconstruct drainage facilities after the contractor completes the sewage collection system. A city or county might be able to provide gravel or fill material to the general contractor at reduced or no cost. State government might consider starting a "self-help" program that encourages and assists local communities in developing their own capacity to handle portions of the sewer project planning, design and construction.

Although construction costs on the immediate project will not be reduced, future costs can be greatly reduced by preparing and implementing sound, effective operation and maintenance plans. Proper operation and maintenance can significantly lengthen the life of facilities, reduce the need for repairs and replacement, and decrease the overall cost of operating and replacing the system. Also, local governments can prevent drastic increases in user fees when major sewer improvements must be made by setting up long term replacement and depreciation accounts. By including such reserve accounts into the sewer rates, the community can build a fund toward replacement and upgrading that will reduce the amount of future funds that must be raised through user rate increases.

Local officials in several nearby communities may be able to save money by forming a single or consolidated district to construct or manage wastewater systems. In Montana, communities typically are geographically distant from one another so little opportunity exists to share common wastewater facilities. However, a number of small communities are located close enough together that common treatment plants might be shared at a cost saving. In some instances small communities are located near larger cities and might be able to connect to the larger city's treatment plant. Another example exists on Flathead Lake, where Somers' best approach to providing a community sewer system will be to connect to the transmission line from Lakeside.

Regardless of distance, communities can achieve significant cost savings by sharing trained personnel who can perform proper operating and maintenance work on several independent systems. Communities can save money by joining together to share the expenses of operation and maintenance, and the costs of administration, such as billing, budget preparation, and capital improvements planning.

Obtaining Favorable Financing Terms

Local officials should try to secure financing that will bring the annual debt service down to a point that will be affordable for individual households. To the extent possible, communities should try to obtain available grants. For loans or bond issues, communities should try to get as long a repayment term as possible, although 20 years is the typical term for many financing sources. Local officials will want to obtain as low an interest rate as possible, but lengthening the term of the bond or loan has a greater effect in lowering annual debt service and thus monthly user fees (see example on page 24).

Communities should strongly consider a dual financing approach in which the owners of all the lots in the community help pay the capital costs for the project, and the households pay the annual operation and maintenance costs. This approach spreads the project cost over a greater number of beneficiaries, and works particularly well in communities that have a large number of vacant lots that would become buildable or at least more valuable as the result of a sewer project. Usually, all lots in a community, whether occupied or not, will be benefitted by sewer improvements because their

market value increases. Therefore, assessing owners of all lots in a community for the capital costs is appropriate. Because existing households receive the sewer service, it is appropriate that they pay the operation and maintenance costs through user fees.

In this case, a general obligation bond, or some other means of assessing all lots, would pay the debt service on financing the construction costs of a sewer project. Lot owners would pay a property tax, or assessment (such as through a rural improvement district) each year to meet debt service requirements. User fees would be charged to households to pay the annual costs of operation and maintenance.

In considering a dual financing arrangement, local officials should examine the community in terms of number of benefitted vacant lots, number of households, the number of low and moderate income and elderly property owners. The objective of the analysis is to find a balanced combination between user fees and property assessments that would provide the most appropriate and affordable financing arrangement for the community.

Providing Effective Technical Assistance

One overlooked component of effective planning and financing of sewer projects is the provision of useful technical assistance. Small communities seldom have the staff or professional expertise to address the many aspects of planning and financing sewer improvements. Through technical assistance provided by the state agencies and private organizations, local communities can learn and understand the various options and measures that can make projects more affordable. The assistance can help small communities with facility planning, financial management, engineer selection, public education, grant/loan administration, and proper operation and maintenance.

The Department of Commerce, DHES, and DNRC are three state agencies that already offer excellent but limited technical assistance to local communities. One step the state could take to make sewer projects more affordable is to fund increased community assistance programs through those agencies. Private organizations such as the Midwest Assistance Program and the Montana Rural Water Association also provide valuable technical assistance and advice to communities facing public works projects. The EPA has published a number of documents that offer excellent technical assistance to local officials. Among the topics the EPA, state agencies and private firms address are: selecting an engineer, setting user rates, assessing alternative wastewater systems, performing a community financial analysis, obtaining grant and loan assistance, and performing proper maintenance.

Obtaining Public Acceptance

The third category of making projects more affordable, obtaining public acceptance, does not directly reduce the project cost or financing. Rather it emphasizes the benefit of agreeing on the long term public benefit of the project, obtaining public support for the project, and ultimately obtaining support for the associated increase in user fees.

Many agencies, and this report, attempt to define "affordability" in quantifiable and consistent terms. However, local residents ultimately define the threshold of affordability by their unwillingness to pay user fees above a certain level. Therefore, an effective public information effort is critical in obtaining citizen support for responsible projects.

Typically, people will resist any increase in service charges. This resistance can be overcome if the residents know that the charges are in line with other communities, or that other alternatives are more expensive, or that delay can increase the cost. Finally, local people should understand that state and federal health agencies will enforce health requirements, through court orders and fines, if necessary.

Many means of informing local citizens can be used, including newspaper features, flyers mailed to each home, public meetings, presentations by state health officials, and radio and television programs. Often the most effective means of convincing residents that a project is needed and worthwhile is in "coffee shop" discussions.

Part of local officials' success in obtaining public support and acceptance will depend on how well they dealt with the first two categories of making projects affordable. **Local residents will be more willing to support a project if they know that elected officials are proposing the least costly approach, and have worked to obtain the most favorable financing package.**

However, even very effective public education cannot overcome the financial reality when a proposed wastewater system will cost more than residents are able to pay (as opposed to willingness to pay).

IX. ALTERNATIVE TECHNOLOGIES

The fact that many small communities cannot afford sewer improvements led EPA and others concerned with sewage treatment to encourage the development and use of alternative technologies. As a result, alternative systems or components of systems often can offer wastewater treatment at lower cost for small communities.

Alternative technologies are not always feasible for all sites or all communities because of soils, climate, topography, or other factors. A community and its consulting engineer should examine local conditions to see whether an alternative system might be beneficial. The EPA currently is emphasizing alternative systems, and requires that communities examine possible alternatives before EPA provides any financial assistance. The EPA has published a number of documents that explain alternative technologies, and compare their respective advantages and disadvantages under different conditions.

Examples of alternative systems that have been used or are being considered in Montana include small diameter sewer lines, Septic Tank Effluent Pump (STEP) systems, and constructed wetlands. Small diameter sewer collection lines can be used to collect sewage effluent from individual septic tanks and carry it to a treatment facility. Plastic lines of 4 or 6 inch diameter can be used instead of the conventional 8 inch pipe. The smaller plastic pipe is less expensive, and can be easily installed in shallow trenches. Manholes are rarely needed, the lines can be placed around trees and buildings, and the collection system can be installed quickly. Small diameter lines can be gravity flow or pressure systems.

One pressure system using small diameter lines is the STEP system. Each septic tank is equipped with a small pump that forces liquid from the septic tank through the plastic line to further treatment. Sludge is pumped from the septic tank periodically. STEP systems can be used with a pump at each house, or in a cluster arrangement where two or more septic tanks feed a single pumping tank that pumps liquid to a treatment facility.

Another alternative pressure collection system uses grinder pumps rather than septic tanks. The grinder pumps grind the sewage and pump it through small diameter lines to a treatment facility. The pumps used with both the STEP or grinder pump systems are small capacity and draw only a minimum of electrical power.

Alternative treatment technologies can save costs for small communities. One example is a constructed wetland that can be installed where soils are fairly impervious. The wetland is created in conjunction with a lagoon to retain the lagoon discharge to facilitate bacterial reduction. The wetland is planted with native marsh vegetation, and it can be constructed deep enough to provide resting areas for waterfowl. Constructed wetlands have low operating and maintenance costs and can be built at less cost than adding lagoon cells.

Another alternative treatment system is rapid infiltration where discharge from a lagoon flows into sandy soils that break down the solids and purify the liquid. This system works well where sandy soils are naturally present, and is less expensive than constructing additional or larger lagoon cells.

Alternative technologies are being considered in each of the four case study communities. In Arlee the engineer believes that a rapid infiltration lagoon facility is appropriate. In addition, Arlee is considering a STEP system and small diameter collection lines. A potential drawback to installing a STEP system is that many of the septic tanks are constructed of 55 gallon drums and other substandard devices that may not provide the initial treatment provided by a properly functioning septic tank.

In Somers a small diameter gravity collection system is proposed to connect the Somers area to the nearby Lakeside sewage transmission line. A STEP system was considered, but probably is not feasible because many of the individual septic systems consist of wooden cribs or other inadequate devices. A pressurized small diameter sewage collection system may be feasible in St. Regis. In Stockett, a STEP system with small diameter collection lines might work well. Also, Stockett might be able to use a lagoon with irrigation for an alternative treatment facility.

The DHES, Montana Department of Commerce and the Midwest Assistance Program all join EPA in encouraging the research and use of alternative technologies. Each community must examine its particular circumstances to determine whether alternative systems will be cost effective in the long term. While initial construction costs can be reduced, operating and maintenance costs must be carefully considered and balanced to find the system that will have the least cost over the life of the facility.

Additional research by Montana colleges and universities into alternative technologies would be beneficial to develop systems that will function effectively in Montana's varied climate, soils, slope and geologic conditions.

In summary, alternative technologies hold promise, however, there are many small communities that – even when the least costly alternative technolgy is proposed – will still need addtional new grant assistance in order to make the project affordable.

X. CONTRACTOR'S CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

1. New wastewater collection and treatment systems and substantial upgrading of existing systems cost in the range of $1 million, even for communities of less than 1,000 people. Those small communities cannot afford to pay for major sewer improvements because the burden on each of the small number of households is more than the families can afford.

2. Even with maximum grants and subsidies under the current available programs, communities smaller than approximately 200 households (500 population) cannot afford to pay for sewer systems. Although the grants and subsidies substantially reduce the local burden, small communities still face a financing gap between what residents can afford and what they must pay.

3. If small communities are to properly address their sewage treatment needs, additional grant assistance will be necessary. The current financial programs are insufficient to bridge the affordability gap experienced by small communities in Montana.

4. The current programs and any new programs must be structured to accommodate each individual community's ability to pay debt service, operation and maintenance costs.

RECOMMENDATIONS

The author recommends the following actions to help make sewer projects more affordable:

1. **The state of Montana and the federal government should provide additional grants for sewer improvements in small low-income communities.** At the state level, the Governor's proposed Big Sky Dividend program could provide financing that would significantly expand the affordability of many sewer and other facilities for small Montana communities. Another opportunity to help make sewer facilities affordable would be to appropriate all the grant monies authorized by statute for the DNRC water development program. In addition to increasing the total amount appropriated under the program, the grant ceilings on individual projects should be changed so that grant amounts can be provided in relationship to a community's ability to pay.

> *Clearly, many small, low-income communities cannot afford to pay for sewer system improvements without new grant sources. As an example, for the estimated cost of a sewer system, St. Regis would need to charge each household $90 per month user fees even with maximum use of currently available grant programs. Existing state and federal grant programs are not sufficiently funded to meet the need for sewer improvements in Montana and to provide affordable financing packages for small communities.*
>
> *The proposed Big Sky Dividend program is a very real opportunity to design a facilities grant program that can make sewer projects affordable for small communities. If the existing DNRC water development program were allocated funds at its current authorized level, approximately $5 million in additional funding would be available to address the affordability problem. Also, it is important that the grant ceiling be changed to allow DNRC to make grants based on the ability of a community to pay the remaining cost.*

2. **State and federal agencies providing financial assistance for sewer improvements in Montana should agree on common indicators of "affordability."**

A common definition of affordability would foster consistency among public funding agencies in providing grant and loan assistance. Also, a common definition would help residents understand how their community's user rates compare with those of other communities.

3. **The state and federal financial assistance agencies should establish a minimum level of financial commitment that a community is expected to contribute toward providing sewer service. No grant or low interest loan should be made unless a community has imposed the above minimum commitment.** That commitment could be met by a user fee, property tax assessment, special assessment and/or an equivalent contribution from the general fund or other dedicated fund account. The minimum level of commitment probably should be based on a sliding scale related to the state definition of affordability, or on a community's median household income.

This requirement would result in more uniformity in local cost sharing among communities, which in turn would help foster greater local willingness to pay a community's share. Also, requiring local communities to provide at least a minimum level of the project costs should have the effect of having more grant and low-interest loan monies available for other communities.

4. **The DNRC renewable resource development and water development programs should be changed to allow the Board of Natural Resources and Conservation to make funding awards without waiting for legislative approval.**

Making this change would greatly improve the timeliness of DNRC assistance and would allow more ready packaging with other programs.

5. **The agencies represented on WASACT should try to bring the requirements of their various financing programs into a body of coordinated and complementary requirements.** Procedural requirements, timing of application and assistance awards, eligibility requirements, and ranking requirements should be coordinated to the fullest extent possible.

6. **The agencies represented on WASACT should develop a coordinated funding effort for sewer projects in which all the agencies jointly consider the various applicant communities, set priorities and select the best financing packages from among the various programs.**

7. **The state should finance more technical assistance, either through state agencies or private organizations, or a combination of both.** One worthwhile measure would be funding a full time WASACT staff person.

Effective technical assistance is invaluable for local communities struggling with capital facility problems, and the present level of assistance should be expanded. Funding a full time WASACT staff position would greatly enhance the coordination and provision of technical assistance. A staff person also could effect coordination of the various financing programs and joint interagency decisions on financing packages, as suggested above.

8. **Procedures of state and federal agencies should be examined to make their programs more timely, and to facilitate funding in conjunction with other programs.**

9. **Administrators of the State Revolving Fund should:**

a. set loan terms based on a community's capacity to pay for sewer improvements;
b. have the flexibility to offer lower interest rates (0–3%) as needed to make the financing affordable;
c. have the flexibility to offer loan terms beyond 20 years, as needed to make the financing affordable;
d. allow a community to repay the loan from any revenue source, whether or not the revenue is connected with the sewer budget.

10. **The state should encourage, and provide financial and technical assistance for wastewater facilities planning, and for overall community capital improvements planning and budgeting.** Capital improvements planning would enhance a community's financial ability to maintain and improve its infrastructure. Grants should be provided to low–income communities, and low interest loans (0–3%) provided to others.

11. **The DHES should continue to look for appropriate opportunities to use alternative wastewater systems.** The state should encourage and fund research in alternative designs that would cost less and be effective in Montana's climate and environmental conditions. Also, the DHES should re–examine its standards of design approval to see if modifications to the standards might encourage wider use of less costly alternative technologies. Engineering firms should be encouraged to consider and use alternative technologies when working with local communities on sewer improvements.

12. **Local communities should consider joining together in single or consolidated districts to share the costs of operation, maintenance, and administration of sewer systems. In some cases, adjacent communities may be able to realize cost savings by using common treatment facilities.**

> *WASACT agencies and organizations should strongly encourage local communities to examine the possible opportunities for joining with other communities in using common facilities or in sharing operating and administrative personnel and equipment. By joining together, small communities may realize cost savings resulting from greater economies of scale.*

REFERENCES

1. Fradkin, L., and others. "Municipal Wastewater Sludge. The Potential Public Health Impacts of Common Pathogens," *Journal of Environmental Health,* Vol 51, No. 3, January/February, 1990.

2. *Operation of Wastewater Treatment Plants. A Field Study Training Program.* Vol. 1. California State University, Dept. of Civil Engineering, Sacramento, 1989.

3. "Funding Local Public Facilities: An Examination of State CDBG Selection Policies." *Newsletter,* Council of State Community Affairs Agencies, January/February, 1990.

4. *Small Community Infrastructure: Subsidies in Transition,* A special report, Council of Infrastructure Financing Authorities, 1989.

5. *A Preliminary Analysis of the Public Costs of Environmental Protection: 1981–2000.* A special report, U.S. Environmental Protection Agency, 1988.

6. "Financing New Drinking Water Requirements," a speech by Michael B. Cook, Director, Office of Drinking Water, U.S. Environmental Protection Agency, May 16, 1990.

7. Montana Department of Commerce. *Governor's Task Force on Infrastructure,* A final report, Helena, 1984.

400 copies of this public document were published at an estimated cost of $1.70 per copy, for a total cost of $680.00 which includes $680.00 for printing and $.00 for distribution.